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GEOGRAPHICAL INFLUENCES IN THE DEVELOPMENT OF WISCONSIN *

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CHAPTER VII. DEVELOPMENT OF MANUFACTURING AND MANUFACTURING CITIES

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Manufacturing in Wisconsin has been marked in recent years by a growth both rapid and substantial. With few exceptions the products are made of native raw materials. The most important products are lumber, saw mill and planing mill products, woodenware, paper, wood pulp, agricultural implements and machinery, flour and grist mill products, malt liquors, cheese, butter, packed meats, leather, boots and shoes, brick and tile. The raw materials for iron and steel manufacture have to be imported, but the transportation facilities and the market make this a profitable undertaking. It is convenient to discuss the more imporant and characteristic industries in related groups rather than in order of commercial importance.

The extensive development of industries relying on timber products for raw material is to be expected in a state whose forests were so extensive and so valuable as those of Wisconsin. In the early days little lumber was cut except on those streams whose many rapids precluded the running of log rafts. Timber was run to market as logs and manufactured at such distributing points as Chicago, St. Louis, Davenport and other Mississippi River towns. After the railroad reduced the damage incident to transportation to a minimum, sorting and dressing of lumber was done more and more at the local mills. The large sawmills added secondary industries, and it is not an uncommon thing to be able to order from one concern everything of wood that goes into the construction of a building. In many places where logs are no longer available, rough lumber is imported and manufactured.

In 1890 there were 88 planing mills reported in the state; in 1900, 123; in 1905, 149. The value of the products in those years was $6,295,000, $8,400,000, and $11,000,000 respectively. It is an interesting fact that in 1900 the town of Merrill, with a population of only about 9,000, had the largest output, valued at $2,227,959.[1]

The manufacture of paper, while originally not an adjunct of the lumbering business, recently has become one of the most important associated industries. The first paper mill in Wisconsin was probably one erected at Milwaukee in 1846. In 1849 this mill employed 10 hands at a cost of $40 a week. The output of 110 reams was sufficient to "supply the entire press of the state."[2] The business thrived for a time, but about 1875 was destroyed by flood and fire. Successful mills were built at Appleton in 1853 and at Whitewater in 1857. The Whitewater plant was bought by a large paper company in 1893 and now stands dismantled.

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[1] Wis. Bur. Lab. Stat., 1903-1904, p. 393.

At Neenah paper making has been a thriving business for years. The first mill, erected in 1865-66, had a capacity of 2,500 to 3,000 pounds a day. The raw material was cotton rags, shipped chiefly from Milwaukee and Chicago. Between 1850 and 1875 paper mills were started at Waterford, Beloit, Sparta, and Fond du Lac.[3] Before 1871 all paper made in Wisconsin was manufactured from cotton rags, white paper waste, or straw; that year the wood pulp process was introduced. At first poplar was used chiefly; now spruce is used very largely. The sulphite process of treating wood for pulp was introduced also first at Appleton, and was used with spruce. The same process was first used on hemlock at Kaukauma. The first tissue mills were erected at Kaukauma in 1885.

The invention of the stereotype cylinder press gave a great impetus to the wood pulp industry, for it made possible the use of dry paper for printing. The price of print paper fell from $11 to $1.20 per hundred pounds and the demand increased enormously. The accessibility of both wood and water power on the upper Wisconsin led to the extensive development there of the paper and wood pulp industry. The first mill was built at Centralia in 1886. At the present time there are mills at Conant's Rapids below Steven's Point, and at Grand Rapids, Nekoosa, Port Edwards, Wausaw, Rhinelander, Merrill, and Tomahawk. They all produce great amounts of ground wood or sulphite wood pulp. The two great paper and wood pulp producing areas are in the forest region where water power is abundant. In 1908 the Wisconsin mills used about 375,000 cords of wood, half of which was spruce and the rest hemlock.[4] The spruce came largely from Minnesota and Canada, and the hemlock from Wisconsin. As the supply of hemlock within the state is limited, the question of the future source of pulp wood is a pertinent one. In 1910 101,702,000 feet of timber, spruce, pine, and poplar, were made into ground wood pulp. Less than one-third of this was grown in the state. 208,591,000 feet of hemlock, spruce, and balsam were used to make pulp by the sulphite process, about half of which was grown in the state.[5]

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[2] Lawson, P. V.: Paper Making in Wisconsin, *Wis. State Hist. Soc. Proc.*, 1909, p. 273.

[3] Wisconsin in Three Centuries, Vol. IV, p. 58.

[4] Lawson, *op. cit.*, p. 279.

In 1905 Wisconsin ranked fourth in capital invested and fifth in value of paper and pulp manufactured. In 1910 there were 57 establishments, having a combined capital of $33,738,000, employing 7,467 hands, who received $3,891,000 in wages. The total output was valued at $25,962,000 and included every grade of paper from coarse wrapper to the finest bond.

Only three states produce more leather than Wisconsin, and the largest tanneries in the world are said to be located in Milwaukee. This is due to the forests and their large resource of hemlock bark. Some of the largest concerns began operations in New England and followed the supply of tan bark to Wisconsin.

The number of hides tanned annually is over 2,000,000, and of calf skins there are about 3,500,000. One large tannery, located at Mellen on the Bad River, employs 1,000 men. It is estimated that there are 600,000 tons of hemlock bark accessible to this plant.[6]

Many varieties and grades of leather are produced. In 1906 the first glazed kid tannery built in the West was erected by a Milwaukee leather company.[7] This is the only branch of the tanning business which requires the importation of all the raw materials from foreign countries.

Although the number of tanneries decreased from 42 in 1899 to 32 in 1909, the number of wage earners in the industry increased 43.4 per cent. and the value of products 122.5 per cent. The value of the products was $44,668,000, which makes the leather industry the fourth in importance in the state.

The Indians ground corn and later wheat by means of a hand mill, which was really a mortar and pestle. The mortar was a log hollowed at one end, or a stone with a depression on one side. The pestle was of wood or stone and had a rounded head. The same method was followed by the French. It was not until about 1809 that power, other than human, was utilized in converting grain into meal or flour. The first grist mill that is recorded was built at Depere shortly after the first saw mill had been erected at the same power site. At Prairie du Chien, as has been noted, crude mills with granite stones were operated by horse power as early as 1816.

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[5] Smith, Franklin H.: Wisconsin Wood-using Industries, p. 33.

[6] Wisconsin in Three Centuries, Vol. IV, p. 72.

[7] Rep't Chamb. Comm. Milwaukee, 1906-1907, p. 51.

One of the first things the pioneer settlers did was to build a flour mill. It was run by water power and marked the center of the agricultural settlement which it served. In many cases it formed the nucleus of a thriving town. One of the first flour mills in the lead region was built at Gratiot in 1835. A grist mill determined the location of the village of Troy in 1837, of Geneva in 1838, and of Whitewater in 1839. A great advance was made in milling by the invention of the steel roller mill in 1874, by John Stevens of Neenah. The new process yielded 90 per cent. of high grade flour, as against 20 to 25 per cent. by the old buhr stone process. The capacity of the mills was increased greatly, and as high grade flour was worth $2.00 a barrel more than low grade, the resulting profit was enormous.[8] This invention made it possible to utilize the hard wheat of the north to much better advantage than before. The new milling system was introduced into Minneapolis in 1880 and shortly made that city the greatest flour manufacturing center in America.

Flour and grist mill products are among the most important in the state. The principal factors in the location of this industry are the raw materials, market, and water power. In some places the manufacture of flour has succeeded the manufacture of lumber, the grist mills utilizing the same power that once ran the saw mills. Many small mills are scattered through the agricutural districts and are engaged largely in grinding feed.

In 1900 Wisconsin's product was valued at $23,700,874 and in 1909 at $31,667,000. Milwaukee had an output in the latter year valued at $8,000,000.

The manufacture of malt liquors is associated with the raising of grain and is one of Wisconsin's most noted industries. The first brewery in Milwaukee, and doubtless the first one in the state, was built in 1840. The first brew was made in July of that year from 130 bushels of barley brought in a sloop across the lake from Michigan City.[9] The original brew-kettle, a copper-lined wooden box, was replaced in 1844 by a copper kettle of Milwaukee manufacture. The capacity of the brewery was thus increased greatly. Several of the principal existing brewing plants were established in the 1840's. The Best Brewing Company was organized in 1842, the Blatz in 1846, and the Schlitz in 1849. In 1856 there were 26 breweries, producing $750,000 worth of ale and beer.[10] In 1870 Milwaukee produced 108,845 barrels of beer; in 1880, 762,220 barrels; in 1900, 2,500,000 barrels; and in 1907, 3,828,484.[11] The last figure is the highest mark yet reached by the malt liquor industry. In 1909 the output decreased to 3,212,911 barrels, which is less than for any year since 1904. While the production for 1907 is considered an abnormal one, the decrease for 1908 and 1909 seems to represent more than the natural reaction. The decrease in the output is due apparently to a decrease in consumption caused by the adoption of prohibition in certain states.[12] Some of the Milwaukee breweries had a large trade in Alabama, Georgia, Mississippi, and Louisiana. Prohibition in these states probably has reduced the demand for malt liquors more than any other cause. In 1910 the production was again high, being 3,724,937 barrels. In 1909 the value of malt liquors produced in the state was $32,126,000. For Milwaukee it was $19,643,000. Of the smaller cities La Crosse is the largest producer, with an output in 1906 valued at $2,217,503.

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[8] Lawson, P. V.: The Invention of the Roller Flour Mill, *Wis. State Hist. Soc. Proc.*, 1907, p. 251.

[9] Wisconsin in Three Centuries, Vol. IV, p. 66.

[10] *Hunt's Merchants' Magazine*, Vol. 41, p. 310.

As indicated in the discussion of agriculture, dairy products were very limited for a long time after the settlement of the state by farmers. In 1850 the counties reported as producing the greatest amount of dairy products were Rock, Walworth, and Waukesha. The total butter output for the three counties was considerably less than half, and the cheese output less than one-third that of Waukesha County alone in 1905. At that time each farm had its dairy, which manufactured cheese and butter from a single herd. In the report of the Secretary of the Wisconsin State Agricultural Society for 1868, the recent introduction and rapid development of the factory system of making cheese is noted. At that time there were nearly 50 such factories, "many of them consuming the milk of 200 to 400 cows, and at least one (the Rosendale factory), of 600 cows." The same report says: "Hitherto, for some reason, but little attention has been given by these cheese-making companies to the manufacture of butter, an article certainly no less susceptible of successful and profitable manufacture under the cooperative or general factory system than cheese, and one the necessity for improvement in the quality of which is universally felt." That butter was not manufactured extensively is not so surprising. Milk was sold by the gallon and quality was not recognized in a commercial way. It was not until after the invention of the cream separator and the Babcock milk tester that butter could be made profitably outside the dairy.

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[11] Rep't Chamb. Comm. Milwaukee, 1908-1909.

[12] *Ibid.*, p. 61.

The manufacture of foreign cheese, which has developed so extensively, had its beginnings in the foreign colonies which early settled in the state. The Wisconsin Swiss cheese was made first in Green and the neighboring counties in the southern part of the state. The people of these colonies had been bred to the dairy business among the mountains of Switzerland, and when they located in the blue grass region of Wisconsin they were admirably situated to continue the occupation. The first cheeses were not larger than a saucer and could be held in a child's hand.[13] Until 1870 there were no factories making Swiss cheese. In that year two were built, with the result that the home manufacture of cheese was given up rapidly for the more profitable factory method. The early cheese makers were Swiss and most of them were foreign born and trained. While this branch of the industry started among the Swiss, people of other nationalities living in the district have become interested in it and contribute to its advancement.

Wisconsin Swiss cheese is acknowledged to be the equal of that made in Switzerland. This is due not more to the fact that the Swiss manufacture it, than to the conditions of climate and soil, which give the water and crops necessary to the production of a good quality of milk. The climatic conditions are favorable, also, to the successful manufacture and preservation of dairy products.

The state is divided into several sections by the dairy and cheese industry (Fig. 33). There is the Swiss cheese region of Green and surrounding counties, where Limburger cheese is also made; two Cheddar cheese regions, one in Richland County and the other in the counties near Lake Michigan; and the brick cheese area of Dodge County. The area of greatest butter production begins at Rock and Walworth Counties and includes Dane and Jefferson. This peculiar segregation of the different phases of the industry is due to nothing more vital, apparently, than the previous training of the people who support the industry. There is a dairy region of rapidly growing importance in central Wisconsin including the counties of Shawano, Oconto, Waupaca, Portage, Wood, Marathon, Clark, Eau Claire, Chippewa, and Barron. It is very probable that as the northern part of the state opens up the dairy industry will thrive even better than in what are now the largest producing counties. The basis for such a supposition is the fact that the cool nights of the summer months, and the nutritious grasses of the "grassland" region of the state all contribute to make this an ideal dairy and cheese section.[14]

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[13] Luchsinger, John: The History of a Great Industry, *Wis. State Hist. Soc. Proc.*, 1898-1899, p. 228.

In 1905, Green County, the center of the Swiss cheese region, realized $1,088,741 from its factories; Dodge County, the center of the brick cheese area, received $1,236,487; Sheboygan, the largest producer of Cheddar cheese, received $1,111,583. These were the only counties receiving more than $1,000,000 from the cheese factories. In the same year Walworth County sold butter to the value of $1,977,090; Jefferson, $1,368,530, and Dane, $1,202,038. In 1909, 105,307,357 pounds of butter were produced in the state,

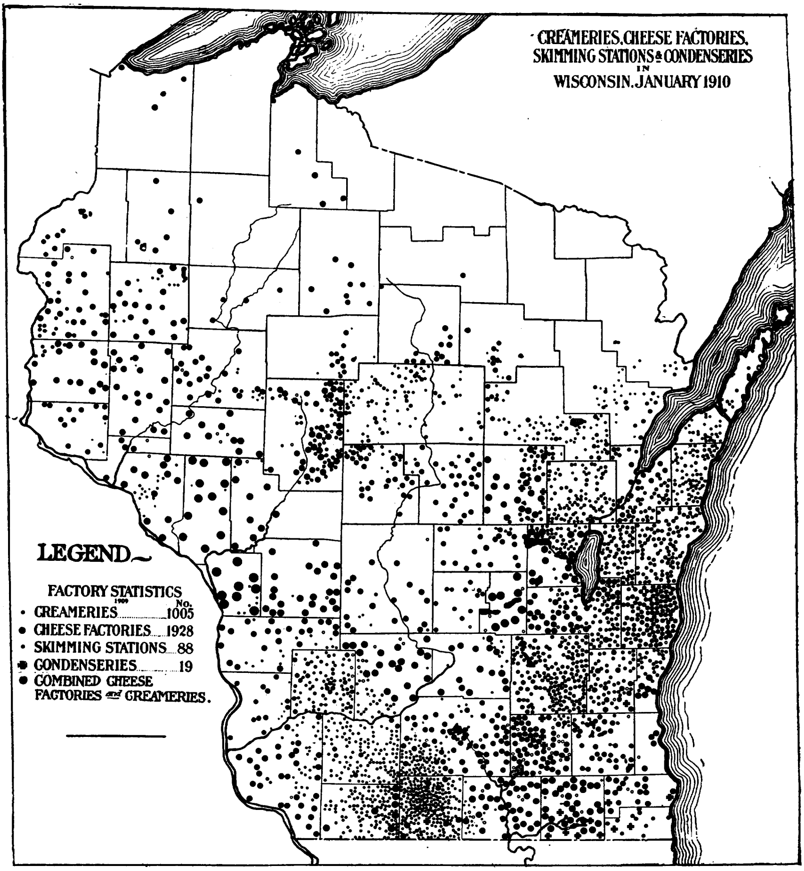
CREAMERIES, CHEESE FACTORIES, SKIMMING STATIONS & CONDENSERIES IN WISCONSIN. JANUARY 1910
LEGEND
FACTORY STATISTICS 1909
No.
• CREAMERIES 1005
● CHEESE FACTORIES 1928
• SKIMMING STATIONS 88
● CONDENSERIES 19
● COMBINED CHEESE FACTORIES and CREAMERIES.

FIG. 33—Creameries, Cheese Factories, Skimming Stations and Condenseries in Wisconsin, January 1910. Scale, 1:4,600,000.

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[14] Wis. Bur. Lab. Stat., 1905-1906, p. 381.

which is an increase of nearly 20 per cent. above the product of 1905. The amount of cheese manufactured was 145,171,035 pounds, —more than 32 per cent. greater than the output in 1905.

The business of slaughtering and meat packing has assumed considerable proportions in Wisconsin, because of the large amount of stock raised, the cool climate, and the cheap transportation to the eastern market. Where there is an abundance of cheap ice and good packing and transportation facilities, the shorter the distance live-stock is moved to a packing center, the greater the profit.

In the decade between 1890 and 1900 there was considerable concentration of the industry. This is made apparent by a decrease of one-half in the number of establishments and an increase of one-third in the output. In 1900 Wisconsin ranked seventh among the states, with a product valued at $13,601,125. Of this amount Milwaukee and Cudahy together produced 94.2 per cent. In 1905 the total value was $16,569,423, 37.5 per cent. of which belonged to Milwaukee. In 1909 the total value for the state was $27,217,000.

The converting of ore into pig iron was begun at Mayville before 1856, but the development of the industry was slow until after the erection of the mills of the Milwaukee Iron Company at Bay View in 1868.[15] The advantages offered by Bay View were several. Land was cheap, and, being outside the city limits of Milwaukee, taxes were low. At the same time the location was near enough to derive the benefits offered by Milwaukee as a large distributing center. There was also the advantage of water and rail transportation. In March, 1868, the first bar of iron rolled in Wisconsin was made at Bay View. At first the mill re-rolled old rails, but presently it made iron directly from the ore which came from Iron Ridge, and from the Lake Superior Mines. In 1880 the 3 mills at Milwaukee and Bay View were the only ones out of the 14 in the state that used coke and coal instead of charcoal for converting ore.[16] At first the fuel was imported from Pennsylvania by way of the lakes. Later, some of it was shipped from Illinois. In 1869 the Bay View concern employed 300 men, of whom only 22 were Americans. A large proportion of the skilled labor came from England and Wales. These men were experts trained in the iron works of Great Britain.[17] At that time the plant had a capacity of 25,000 tons of finished rails per annum.[18]

The manufacture of iron is carried on most extensively in the counties of Milwaukee, Racine, and Rock. There are three blast furnaces in the state—one at Ashland, which uses Penokee-Gogebic ore, one at Mayville, which uses Dodge County ore, and the third at Bay View, which uses both Dodge County and Lake Superior ore. In 1905 there were 14 establishments manufacturing iron and steel. 2,397 men find employment in these works and produce $10,453,750 worth of material. The combined output of the iron and steel manufactories and of the foundry and machine shops was valued at $40,361,751, of which Milwaukee produced 42.7 per cent. In 1909 the total value for the state was $65,057,000.

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[15] *Trans. Wis. State Agric. Soc.*, 1869, p. 48.

[16] Geology of Wisconsin, Vol. I, p. 614.

[17] *Trans. Wis. State Agric. Soc.*, 1869, p. 52.

[18] *Ibid.*, p. 49.

The chief manufacturing cities of the state are Milwaukee, Superior, Racine, Oshkosh, La Crosse, and Sheboygan. Milwaukee, located where Milwaukee River empties into a crescent-shaped bay, is acknowledged to have the best natural harbor on the west side of Lake Michigan. The first settlement, other than that connected with the fur trade, was in 1834, and growth has been rapid and constant. For years there was great rivalry between the lake ports, and it was uncertain whether Wisconsin's metropolis would be at Racine, Milwaukee, or Green Bay. For a long time Green Bay was the popular favorite, and the newspapers of that city were full of sarcastic comments on the pretensions of the village of Milwaukee. The advantages of the Lake Michigan ports, exclusive of Green Bay, were much the same. Milwaukee had the advantage of an early start; it was located centrally with regard to the agricultural area, and these two things, combined with its harbor facilities, gave it a permanent lead.

The industries which now represent the greatest proportion of the wealth of the city were, most of them, started early. The flour mill and brewery industries were established first. The first tannery was started in 1842.[19] In 1843 a foundry and a woolen mill were erected.[20] The same year the first pier was built to accommodate shipping. In 1847 a steam flouring mill was built and two years later an iron foundry and locomotive works. The first locomotive built in the state was in this shop.[21]

In 1854 the manufactures of Milwaukee had an estimated value of $4,600,000, and in 1856, of $8,000,000. In the latter year the iron manufactures amounted to $1,500,000; the malt liquors to $750,000; distilled liquors, $500,000; flour, $700,000; slaughtering and meat packing, $400,000; tanning and wool pulling, $280,000; boots and shoes, $350,000; brick, $350,000.[22] It is to the many buildings made of this cream-colored brick that Milwaukee owes its name of the "Cream City."

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[19] Buck, J. S.: Pioneer History of Milwaukee, Vol. II, p. 147.

[20] *Ibid.*, p. 156.

[21] *Ibid.*, p. 180.

In 1909 the total value of manufactures was $208,324,000, an increase of 51 per cent. since 1904. This gives Milwaukee tenth place among the manufacturing cities of the United States. The number of wage earners employed in manufacturing was 59,502, an increase of 37 per cent. since 1904. Milwaukee reported 35.3 per cent. of the total value of manufactured products for the state in 1909, and employed 32.6 per cent. of the total number of wage earners. More than one-third of the total value of the foundry and machine-shop products of the state; about three-fifths of the value of products for the leather, brewery, and printing and publishing industries; nine-tenths of that for the fur-goods and the paint and varnish industries; and the entire output of the millinery and lace-goods industry were reported from Milwaukee. According to the Bureau of the Census the value of the products for the steel works and rolling mills in the state was mostly reported from Milwaukee, but the statistics for the industry for the city can not be shown without disclosing individual operations. In 1909 Milwaukee held first place among the cities of the United States in the value of leather tanned, curried, and finished, and third place in that of malt liquors brewed.

In addition to being by far the most important manufacturing city in the state, Milwaukee is also the commercial metropolis. On August 27, 1859, two steamers, newly launched at Buffalo, the *Detroit* and *Milwaukee*, arrived to enter the lake trade between Milwaukee and Grand Haven on the Detroit and Milwaukee Railway system. This marked an epoch in Milwaukee's lake trade, as they were the first boats to run on regular schedule out of the city. In 1910 the lake commerce included 5,790 arrivals with a tonnage of 8,559,023, and 5,683 clearances, with a tonnage of 8,426,731. The total receipts of grain were 47,204,573 bushels, of which 10,173,690 bushels were wheat; 8,074,950, corn; 13,097,150, oats; 14,908,693, barley; and 534,073, rye. The receipts of flour were 3,124,853 barrels and the shipments were 3,705,384. 5,588,683 tons of coal were imported.[23]

One of the main elements in Milwaukee's success as a commercial city is the harbor. Over $2,000,000 have been expended already on the harbor improvements, three-fourths of which has been furnished by the federal government.[24] Over $1,000,000 was spent in building a harbor of refuge. Improvements now going on involve the construction of the outer breakwater by the federal government. Plans for the extensive improvement of the harbor, including the utilization of Jones Island, have been developed recently. Isham Randolph, expert engineer of Chicago, prepared the plans and is quoted as saying that "there is on the west shore of Lake Michigan no really commodious and ample harbor suited to the requirements of our modern lake freighters, and no city on that shore can so easily and so cheaply provide a harbor which will invite commerce as can Milwaukee." The plans would require the ultimate expenditure of $4,606,569. The designs cover vast docks and piers, and a municipal belt line railroad which would afford direct communication with water transportation facilities. It would also allow other railroads to enter the city besides the ones now operating there. The cost would fall upon the city, the railroad companies in the building of their own docks, and the federal government. The city's share in the expense would be about half the estimated cost. Should such extensive harbor improvements be carried out, the growth of the city in population, manufactures, and commerce would no doubt make it a profitable investment.

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[22] *Hunt's Merchants' Magazine*, Vol. 41, p. 139.

[23] Milwaukee Sentinel, Jan. 1, 1911.

La Crosse, located on the Mississippi River at the mouth of the La Crosse, and a few miles below the mouth of the Black, has several advantages of position. It was supported by the lumber business, which developed at the mouth of these rivers, which flowed through the pine and hardwood forests. It has the benefit of river transportation and its effect on freight rates. It has excellent railroad facilities and was called the "Gateway City" when the Chicago, Milwaukee, and St. Paul Railroad crossed the Mississippi at this point on its way west. La Crosse also has the support of a rich agricultural region.

In 1853 the town contained 10 saw mills, 3 shingle mills, 1 sash and blind factory, and an iron foundry.[25] In 1874 there were 3 large saw mills and several smaller ones, 1 sash, door and blind factory, 7 factories making farming implements, including threshing machines, 3 foundries, as well as several other industries of importance.[26] For years lumber products of various kinds were the chief manufactures, and the total value of manufactures naturally diminished with the decline of the lumber business. In recent years there has been increasing diversification and growth of manufactures outside of the lumber industry. Between 1900 and 1905 the value of agricultural implements increased 47.4 per cent.; carriages and wagons, 53.3 per cent.; flour and grist mill products, 79.1 per cent.; malt liquors, 27 per cent. In 1905 La Crosse manufactured about 20 per cent. of the state's confectionery product, valued at $475,000. In 1909 the total value of manufactured products was $14,103,000, an increase of 73 per cent. in 5 years.

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[24] Rep't Chamb. Comm. Milwaukee, 1903-1904, p. 61.

[25] Ritchie, J. S.: Wisconsin and Its Resources, p. 118.

[26] Tuttle, C. R.: History of Wisconsin, p. 76.

Oshkosh is located on Lake Winnebago at the mouth of the Wolf River. The Wolf ran through a heavily wooded area of excellent timber and early became an important lumbering stream. The bulk of this timber was brought to Oshkosh and made that city above all a manufacturer of forest products. In 1855 Oshkosh contained 14 saw mills manufacturing 25,000,000 feet of lumber.[27] It contained also steam shingle and grist mills. Oshkosh has been called the "Sawdust City" because of the many acres of low land and marsh land along the river front that were filled in and reclaimed with sawdust. Many of the streets in the saw mill district were paved with sawdust. This inflammable material was often the cause of fires which lasted for days and even weeks.[28] Between 1890 and 1900 the value of manufactured products represented an increase of only 1.9 per cent. In spite of the small total increase this indicates an improvement in the general industrial conditions and a growth in new lines, as there was a heavy loss in lumber and timber products. Between 1900 and 1905 Oshkosh gained less than 1 per cent., but the planing mill products had increased 51 per cent. In 1909 the value of all manufactured products was $14,739,000, an increase of 70 per cent. since 1904.

Racine, at the mouth of the Root River, was settled in 1843. It was said by its supporters to have "one of the best, if not the very best harbor on the western shore of the lake,"[29] and one that was large enough to "accommodate the entire shipping of the lakes." In 1853 it had 3 flouring mills, one of which was run by steam. From the town three roads were being built into the interior of the state—one west to Burlington, Elkhorn, and Delavan, one southwest to Wilmot, and a third northwest. In the 1860's the manufacture of wagons and agricultural implements, including threshing machines, became well established and along this line Racine's manufacturing industries have concentrated. Not having been dependent upon the pine forest for raw materials, the manufacturing interests did not suffer with the decline of lumbering. Having access to hardwood forests for supplies and to the great agricultural region at the west for a market, Racine's growth along industrial lines has been steady and rapid. In 1905 the more important industries ranked according to the value of products as follows: agricultural implements, first; carriages and wagons and automobiles, second; foundry and machine shop products, third; and patent medicines, with a value of $665,810, fourth. In 1909 the total value of manufactures was $24,673,000, an increase of 50 per cent. over 1904.

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[27] Ritchie, *op. cit.*, p. 119.

[28] Wisconsin in Three Centuries, Vol. IV. p. 36.

[29] Hunt's Wisconsin Gazeteer, 1853, p. 183.

Sheboygan is another Lake Michigan port, at the mouth of Sheboygan River. Because it had not attained the size of 20,000 until after 1890 its manufactures were not reported separately in the federal census until 1900 and comparisons cannot be made before that date. Sheboygan is known as the ''Chair City'' from the fact that some 10,000 chairs are made there daily. A reputation for chairs was established in the 1860's, when the city's population was less than 3,000. In 1900 nearly one-half of the $7,469,202 worth of manufactures was factory-made furniture. In 1905 it constituted 38 per cent. of the $10,086,648 product. In 1909 the total value of manufactures was $11,290,000, a gain of 17 per cent. since 1904.

Superior is located at the mouths of the St. Louis and Nemadji Rivers and has, with Duluth, the best harbor on the Upper Lakes. Very early much was prophesied for the town, and about 1850 a typical frontier boom was started. The town was laid out in 1853. In 1856 it had 4 saw mills and a total of 190 buildings. In 1857 the business houses alone numbered 340.[30] There was no substantial basis for growth and development until after the Northern Pacific Railroad reached the place early in the 1860's. Then the town grew with wonderful rapidity. In 1905 the state census reported a population of 36,551, and in 1909 it was 40,384. In 1905 flour and grist mill products constituted 56.9 per cent. of the total manufactures of Superior. Next in value came foundry and machine shop products, while lumber and timber products were valued at only $85,788. A readjustment is evidently going on in Superior. The industries which rely on the forests for raw materials are decreasing. Those dependent on the materials furnished by the agricultural hinterland and upon cheap water transportation are increasing. The value of manufactures in 1909 was $6,574,000, a slight increase over 1904.

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[30] Ritchie, *op. cit.*, p. 235.

The towns of Wisconsin do not differ materially from one another in industrial conditions. The fact that a particular town is noted for a special industry rather than any neighboring town depends often on no more important factors than an earlier start or more efficient management. In the Fox River valley, Appleton, Neenah, and Depere are noted for paper and wood pulp manufacture. Green Bay has several thriving industries, the most important being lumber and planing mill products. Menasha is known as the "Woodenware City." Fond du Lac has large tanning interests, and Berlin produces much flour and feed. Toward the south, Beaver Dam has large iron works which reflect the proximity of the Dodge County iron mines. Beloit has a large output of machinery and pumps. Janesville produces agricultural implements and barbed wire. Kenosha and Port Washington make furniture and beds. Madison and Stoughton make a specialty of agricultural implements, and carriages and wagons. Sparta manufactures cigars and tobacco. In the upper Wisconsin valley Steven's Point and Grand Rapids make large quantities of paper and wood pulp, and most of the towns in the forest area still manufacture considerable quantities of saw mill and planing mill products, as well as other secondary forest products.

Manufactures are scattered rather widely, but by no means evenly, over the state. This fact is apparent from Figure 34, which represents graphically each county's relative contribution in 1900 to the total manufactures of the state.

Milwaukee County produces 38.87 per cent. of the manufactures for the state. The counties bordering on the Lakes, including those on Green Bay, show relatively high percentage of products. All of the lake counties, exclusive of Milwaukee, furnish 23.15 per cent., and including Milwaukee, 62.03 per cent. If to the 15 lake counties be added the 4 counties along the lower Fox having easy water communication with the lakes, then the total amount of their manufactures is 70.59 per cent.

The controlling factors, in the case of the lake counties, seem to be the abundance of raw materials and the proximity to market, the market being easily accessible by water. The raw materials are forest products, grain, live stock, iron, and coal. While iron and coal do not occur in any of the lake counties, their location gives them easy access to Lake Superior iron and to coal from the East or from Illinois. In addition, the counties along the lower Fox have the advantage of abundant water power.

Two groups of counties with important manufacturing interests, one along the upper Wisconsin and the other along the upper Chippewa, are in the midst of the forest region and in the crystalline rock area, where water power is abundant. The forests furnish the raw materials, and the logs are carried on the rivers to the saw mill towns, almost all of which are located at water power sites. The same conditions hold for St. Croix and Dunn Counties, but the amount of the product is smaller. La Crosse County shows the influence of the same factors, added to which is that of unusually good railroad service.

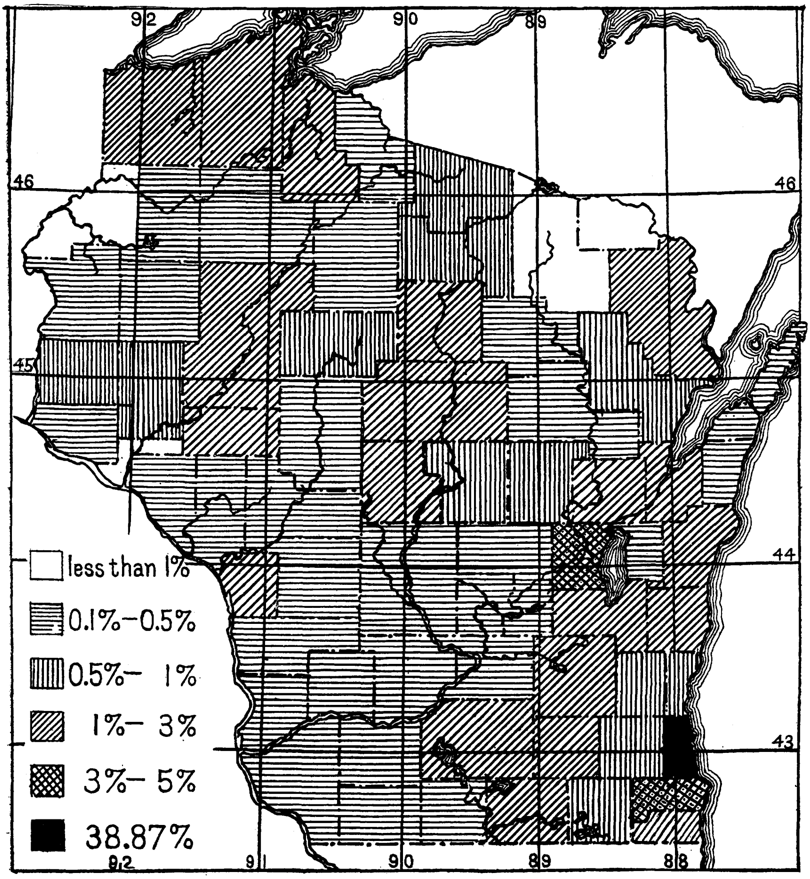

Fig. 34—Percentage of Total Manufacturers in Each County in 1899. Scale, 1:4,500,000.

A group of counties in the south-central part of the state, consisting of Dane, Dodge, Jefferson, and Rock, produce 7.5 per cent. of the state's manufactures. A large part of this is in agricultural implements, machinery, carriages and wagons, paper, flour and feed, and malt liquors, for which the raw materials as well as the markets are near at hand. In general, then, the two most important factors locating manufactures in Wisconsin are raw materials and markets. Water power, which has been in the past a very important element in the problem of manufacturing, will, without doubt, be equally important in the future.

Nothing demonstrates more clearly the transition of the state from an agricultural to a manufacturing community than the concentration of population in cities. Of a population of 2,333,860 in 1909, 43 per cent. live in the cities. There are nine cities with a population of over 20,000. These are Milwaukee, Superior, Racine, Oshkosh, La Crosse, Madison, Sheboygan, Green Bay, and Kenosha. Their combined population is over 600,000. The eighteen cities having a population of over 10,000 contain one-third of the total population. There are eighty-four cities which have more than 2,000 inhabitants each.

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